AMENDMENTS TO THE CLAIMS

1   1 (Currently Amended). An iterative equalizer for a data communication system for recovering

2   received data transmitted over a data channel comprising:

3   a first <u>linear</u> filter for filtering <u>a block of</u> received data according to first filter

4   parameters to generate first-filtered data;

5   a combiner for modifying the first-filtered data with second-filtered data to

6   generate modified data;

7   a decision device for generating modified tentative decisions <u>on all data in the</u>

8   <u>block</u> based on the modified data, the modified tentative decisions being modified with

9   respect to tentative decisions of a previous iteration; and

10   a second <u>linear</u> filter for causally and anticausally filtering <u>said block of</u> tentative

11   decisions from a previous <s>iteration</s> <u>pass</u> according to second filter parameters to generate

12   said second-filtered data;

13   wherein <u>said received block of data is filtered more than once by multiple passes</u>

14   <u>through the data, each pass and</u> said first and second filter parameters are based on the

15   received data and the intersymbol interference is removed from said modified data in a

16   nonlinear manner.

1   2 (Original). The equalizer of claim 1 wherein the first and second filter parameters are modified

2   at each iteration.

1   3 (Original). The equalizer of claim 1 wherein the equalizer is fractionally-spaced in that the

2   received data is sampled at a rate higher than a symbol rate associated with the received data.

1   4 (Original). The equalizer of claim 1 wherein the received data comprises symbol data.

1   5 (Original). The equalizer of claim 1 wherein the first and second filter parameters are modified

2   at each iteration according to channel parameters that are re-estimated at each iteration based on

3   the received data.

1   6 (Original). The equalizer of claim 1 wherein the received data is encoded for error-correction

2   coding, and wherein the decision device comprises an error-correction decoder and further

3   comprising an encoder for error-correction encoding the tentative decisions from a previous

4   iteration.

1   7 (Currently Amended). The equalizer of claim 1 wherein the first and second filters comprise

2   filter types selected from the group of filter types consisting of: ~~linear, non-linear,~~ time-variant,

3   time-invariant, infinite-impulse-response, and finite-impulse-response filters.

1   8 (Original). The equalizer of claim 1 wherein the received data comprises a plurality of

2   received signals received over a plurality of said data channels, and wherein the equalizer further

3   comprises a like plurality of said first filters corresponding to the plurality of channels.

1   9 (Original). The equalizer of claim 1 wherein the received data comprises combined data for a

2   plurality of users, and wherein the equalizer further comprises a like plurality of said second

3   filters corresponding to the plurality of users.

1   10 (Original). The equalizer of claim 1 wherein the first filter, combiner, decision device and

2   second filter are distributed among a data channel transmitter and receiver.

1   11 (Currently Amended). An iterative equalizer for a data communication system for recovering

2   received data transmitted over a data channel having channel parameters comprising:

3   a first <u>linear</u> filter for filtering <u>a block of</u> received data according to first filter

4   parameters to generate first-filtered data;

5   a combiner for modifying the first-filtered data with second-filtered data to

6   generate modified data;

7   a decision device for generating modified tentative decisions <u>on all data in the</u>

8   <u>block</u> based on the modified data, the modified tentative decisions being modified with

9   respect to tentative decisions of a previous iteration; and

10   <u>a second linear filter for causally and anticausally filtering said block of tentative</u>

11   <u>decisions from a previous pass according to second filter parameters to generate said</u>

12   <u>second-filtered data</u> ~~a second filter for causally and anticausally filtering tentative~~

13   ~~decisions from a previous iteration according to second filter parameters to generate said~~

14   ~~second-filtered data~~;

15   wherein <u>said received block of data is filtered more than once by multiple passes</u>

16   <u>through the data, each pass and</u> said first and second filter parameters are based on an

17   estimate of said channel parameters, and wherein the received data is encoded for error-

18   correction coding, and wherein the decision device comprises an error-correction decoder

19   and further comprising an encoder for error-correction encoding said tentative decisions

20   from a previous iteration so that intersymbol interference is removed from said modified

21   data in a nonlinear manner.

1   12 (Original). The equalizer of claim 11 wherein said first and second filter parameters are

2   modified at each iteration.

1   13 (Currently Amended). An iterative equalizer for a data communication system for recovering

2   received data transmitted over a plurality of data channels comprising:

3   a first linear filter for filtering received a block of data according to first filter

4   parameters to generate first-filtered data;

5   a combiner for modifying the first-filtered data with second-filtered data to

6   generate modified data;

7   a decision device for generating modified tentative decisions on all data in the

8   block based on the modified data, the modified tentative decisions being modified with

9   respect to tentative decisions of a previous iteration; and

10   a second linear filter for causally and anticausally filtering said block of tentative

11   decisions from a previous pass according to second filter parameters to generate said

12   second-filtered data a second filter for causally and anticausally filtering tentative

13   decisions from a previous iteration according to second filter parameters to generate said

14   second-filtered data;

15   wherein said received block of data is filtered more than once by multiple passes

16   through the data, each pass and said first and second filter parameters are based on an

17   estimate of said channel parameters, and wherein the received data comprises a plurality

18   of received signals received over the plurality of data channels, and wherein the equalizer

19   further comprises a like plurality of said first filters corresponding to the plurality of

20   channels so that intersymbol interference is removed from said modified data in a

21   nonlinear manner.

1   14 (Original). The equalizer of claim 13 wherein said first and second filter parameters are

2   modified at each iteration.

1   15 (Currently Amended). An iterative equalizer for a data communication system for recovering

2   received data transmitted over a data channel comprising:

3   a first <u>linear</u> filter for filtering <u>a block of</u> received data according to first filter

4   parameters to generate first-filtered data;

5   a combiner for modifying the first-filtered data with second-filtered data to

6   generate modified data;

7   a decision device for generating modified tentative decisions <u>on all data in the</u>

8   <u>block</u> based on the modified data, the modified tentative decisions being modified with

9   respect to tentative decisions of a previous iteration; and

10   <u>a second linear filter for causally and anticausally filtering said block of tentative</u>

11   <u>decisions from a previous pass according to second filter parameters to generate said</u>

12   <u>second-filtered data</u> ~~a second filter for causally and anticausally filtering tentative~~

13   ~~decisions from a previous iteration according to second filter parameters to generate said~~

14   ~~second-filtered data;~~

15   wherein <u>said received block of data is filtered more than once by multiple passes</u>

16   <u>through the data, each pass and</u> said first and second filter parameters are based on an

17   estimate of said channel parameters, and wherein the equalizer is fractionally spaced in

18 that the received data is sampled at a rate higher than a symbol rate associated with the

19 received data so that intersymbol interference is removed from said modified data in a

20 nonlinear manner.

1 16 (Original). The equalizer of claim 15 wherein said first and second filter parameters are

2 modified at each iteration.

1 17 (Currently Amended). A method for recovering received data transmitted over a data channel

2 in a data communication system comprising iteratively:

3 first-filtering <u>a block of</u> received data according to first filter parameters to

4 generate first-filtered data;

5 modifying the first-filtered data with second-filtered data to generate modified

6 data;

7 generating modified tentative decisions <u>on all data in the block</u> based on the

8 modified data, the modified tentative decisions being modified with respect to tentative

9 decisions of a previous iteration; and

10 <u>causally and anticausally filtering said block of tentative decisions from a</u>

11 <u>previous pass according to second filter parameters to generate said second-filtered</u>

12 <u>data</u>~~causally and anticausally filtering tentative decisions from a previous iteration~~

13 ~~according to second filter parameters to generate said second-filtered data~~;

14 wherein <u>said received block of data is filtered more than once by multiple passes</u>

15 <u>through the data, each pass and</u> said first and second filter parameters are based on the

16   received data so that intersymbol interference is removed from said modified data in a

17   nonlinear manner.

1   18 (Original). The method of claim 17 further comprising modifying the first and second filter

2   parameters at each iteration.

1   19 (Original). The method of claim 17 wherein the received data is sampled at a rate higher than

2   a sample rate associated with the received data.

1   20 (Original). The method of claim 17 wherein the received data comprises symbol data.

1   21 (Original). The method of claim 17 further comprising modifying the first and second filter

2   parameters at each iteration according to channel parameters that are re-estimated at each

3   iteration based on the received data.

1   22 (Original). The method of claim 17 wherein the received data is encoded for error-correction

2   coding, and wherein generating modified tentative decisions based on the modified data

3   comprises error-correction decoding the modified data and further comprising error-correction

4   encoding the tentative decisions from a previous iteration.

1   23 (Currently Amended). The method of claim 17 wherein the first and second filters comprise

2   filter types selected from the group of filter types consisting of: ~~linear,~~ non-linear, time-variant,

3   time-invariant, infinite-impulse-response, and finite-impulse-response filters.

1   24 (Original). The method of claim 17 wherein the received data comprises a plurality of

2   received signals received over a plurality of said data channels, and further comprising first-

3   filtering the received data at a plurality of first filters corresponding to the plurality of channels.

1   25 (Original). The method of claim 17 wherein the received data comprises combined data for a

2   plurality of users, and further comprising second-filtering the tentative decisions from a previous

3   iteration at a plurality of second filters corresponding to the plurality of users.

1   26 (Original). The method of claim 17 wherein the first filter, combiner, decision device and

2   second filter are distributed among a data channel transmitter and receiver.

1   27 (Currently Amended). A method for recovering received data transmitted over a data channel

2   having channel parameters, in a data communication system, comprising iteratively:

3   first-filtering <u>a block of</u> received data according to first filter parameters to

4   generate first-filtered data;

5   modifying the first-filtered <u>a block of</u> data with second-filtered data to generate

6   modified data;

7   generating modified tentative decisions <u>on all data in the block</u> based on the

8   modified data, the modified tentative decisions being modified with respect to tentative

9   decisions of a previous iteration; and

10   <u>causally and anticausally filtering said block of tentative decisions from a</u>

11   <u>previous pass according to second filter parameters to generate said second-filtered</u>

12   <u>data</u><s>causally and anticausally filtering tentative decisions from a previous iteration</s>

13   <s>according to second filter parameters to generate said second-filtered data;</s>

14   wherein <u>said received block of data is filtered more than once by multiple passes</u>

15   <u>through the data, each pass and</u> said first and second filter parameters are based on an

16   estimate of said channel parameters, and wherein the received data is encoded for error-

17   correction coding, and wherein generating modified tentative decisions based on the

18   modified data comprises error-correction decoding the modified data and further

19   comprising error-correction encoding the tentative decisions from a previous iteration so

20   that intersymbol interference is removed from said modified data in a nonlinear manner.

1   28 (Original). The method of claim 27 further comprising modifying the first and second filter

2   parameters at each iteration.

1   29 (Currently Amended). A method for recovering received data transmitted over a plurality of

2   data channels having channel parameters, in a data communication system, comprising

3   iteratively:

4   first-filtering <u>a block of</u> received data according to first filter parameters to

5   generate first-filtered data;

6   modifying the first-filtered data with second-filtered data to generate modified

7   data;

8   generating modified tentative decisions <u>on all data in the block</u> based on the

9   modified data, the modified tentative decisions being modified with respect to tentative

10 decisions of a previous iteration; and

11   <u>causally and anticausally filtering said block of tentative decisions from a</u>

12 <u>previous pass according to second filter parameters to generate said second-filtered</u>

13   ~~data~~ causally and anticausally filtering tentative decisions from a previous iteration

14   according to second filter parameters to generate said second filtered data;

15   wherein said received block of data is filtered more than once by multiple passes

16   through the data, each pass and said first and second filter parameters are based on an

17   estimate of said channel parameters, wherein the received data comprises a plurality of

18   received signals received over the plurality of data channels, and further comprising first-

19   filtering the received data at a plurality of first filters corresponding to the plurality of

20   channels so that intersymbol interference is removed from said modified data in a

21   nonlinear manner.

1   30 (Original). The method of claim 29 further comprising modifying the first and second filter

2   parameters at each iteration.

1   31 (Currently Amended). A method for recovering received data transmitted over a data channel

2   having channel parameters, in a data communication system, comprising iteratively:

3   first-filtering a block of received data according to first filter parameters to

4   generate first-filtered data;

5   modifying the first-filtered data with second-filtered data to generate modified

6   data;

7   generating modified tentative decisions on all data in the block based on the

8   modified data, the modified tentative decisions being modified with respect to tentative

9   decisions of a previous iteration; and

10   causally and anticausally filtering said block of tentative decisions from a

11   previous pass according to second filter parameters to generate said second-filtered

12   data~~causally and anticausally filtering tentative decisions from a previous iteration~~

13   ~~according to second filter parameters to generate said second-filtered data~~;

14   wherein said received block of data is filtered more than once by multiple passes

15   through the data, each pass and said first and second filter parameters are based on an

16   estimate of said channel parameters, and wherein the received data is sampled at a rate

17   higher than a symbol rate associated with the received data so that intersymbol

18   interference is removed from said modified data in a nonlinear manner.

1   32 (Original). The method of claim 31 further comprising modifying the first and second filter

2   parameters at each iteration.